

f :llä ja g :llä on samat arvoajankohdat, g jatk. ja derivo. väl. $[-1,1]$

$$g'(t) = 6t - 4 = 0 \quad (\Rightarrow) t = \frac{4}{6} = \frac{2}{3}$$

- päätökohdat: $g(-1) = 3 \cdot (-1)^2 - 4 \cdot (-1) + 1 = 3 + 4 + 1 = 8$ suurin arvo

$$g(1) = 3 \cdot 1^2 - 4 \cdot 1 + 1 = 3 - 4 + 1 = 0$$

- g 'in 0-kohdat: $g\left(\frac{2}{3}\right) = 3 \cdot \left(\frac{2}{3}\right)^2 - 4 \cdot \frac{2}{3} + 1 = \frac{4}{3} - \frac{8}{3} + \frac{3}{3} = -\frac{1}{3}$

pienin arvo

19.6 $f(x) = \cos 2x - 4 \sin x$

$$= (1 - 2 \sin^2 x) - 4 \sin x = -2 \sin^2 x - 4 \sin x + 1$$

km. $t = \sin x$: $g(t) = -2t^2 - 4t + 1$, $t \in [-1,1]$

f :llä ja g :llä on samat arvoajankohdat, g jatk. ja derivo. väl. $[-1,1]$

$$g'(t) = -4t - 4 = 0 \quad (\Rightarrow) t = -\frac{4}{4} = -1$$

- päätökohdat: $g(-1) = -2(-1)^2 - 4 \cdot (-1) + 1 = -2 + 4 + 1 = 3$ suuri

$$g(1) = -2 \cdot 1^2 - 4 \cdot 1 + 1 = -2 - 4 + 1 = -5$$
 pieni

- g 'in 0-kohdat: $g(-1) = 3$

19.8 $f(x) = \cos^2 x + \sin x$

$$= (\cos x)^2 + \sin x$$

$$= (1 - \sin^2 x) + \sin x = -\sin^2 x + \sin x + 1$$

km. $t = \sin x$: $g(t) = -t^2 + t + 1$, $t \in [-1,1]$

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$$g'(t) = -2t + 1 = 0 \quad (\Rightarrow) 1 = 2t \quad (\Rightarrow) t = \frac{1}{2}$$

- päätökohdat: $g(-1) = -(-1)^2 - 1 + 1 = -1 - 1 + 1 = -1$

$$g(1) = -1^2 + 1 + 1 = -1 + 1 + 1 = 1$$

- g 'in 0-kohdat: $g\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 1 = -\frac{1}{4} + \frac{2}{4} + \frac{4}{4} = \frac{5}{4}$

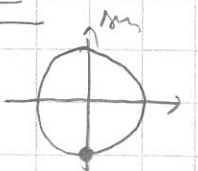
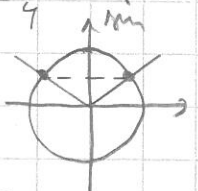
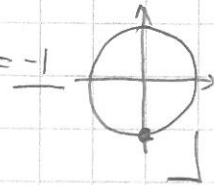
\Rightarrow suurin arvo: $\frac{5}{4}$ km $t = \sin x = \frac{1}{2} = \sin \frac{\pi}{6}$

$$(\Rightarrow) x = \frac{\pi}{6} + m2\pi \quad \text{tai} \quad x = \pi - \frac{\pi}{6} + m2\pi$$

$$x = \frac{5\pi}{6} + m2\pi, m \in \mathbb{Z}$$

pienin arvo: -1 km $t = \sin x = -1 = \sin \frac{3\pi}{2}$

$$(\Rightarrow) x = \frac{3\pi}{2} + m2\pi, m \in \mathbb{Z}$$



19.10 $g(x) = 4 \sin^2 x + 3 \cos^2 x$

$$= 4(1 - \cos^2 x) + 3 \cos^2 x = 4 - \cos^2 x = 4 - \underbrace{(\cos x)^2}_{-1 \leq v \leq 1}$$

suurin arvo: $4 - 0^2 = 4$

pienin arvo: $4 - (\pm 1)^2 = 4 - 1 = 3$ } arvoajankohdat $[3, 4]$
 g jatkava